



2023 GLOBE ANNUAL MEETING

DENVER, COLORADO, USA | 17-20 July

GLOBE Science Opens Global Benefits

Meeting sponsored by:



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SOCIAL MEDIA • CONNECT • SHARE • LEARN



Dear Attendees,

Welcome to Colorado! Home of the NBA Champions the Denver Nuggets and many from the GLOBE Implementation Office (GIO).

I am thrilled that you have chosen to take part in this year's GLOBE Annual meeting, the 27th since the founding of the Program in 1995. All those who have been involved in organizing the event are committed to ensuring that the meeting allows you to share your science and experiences, and to meet and learn from others in the GLOBE Community, as effectively as possible. After three years of virtual annual meetings, I hope you can take the opportunity to reacquaint yourself with friends you have only met online and make new friends from the GLOBE Community as well.

I would like to thank the International Organizing Committee for their work in helping to create a diverse and engaging schedule that will enable all of us to explore the theme of 'Open Science' over the course of the four days we have together. At the heart of the meeting are the Community presentation sessions, where we get a chance to hear about all the amazing work that you are doing around the world to enable more people to broaden participation and increase accessibility to knowledge. I am impressed with the breadth and depth of the sessions on this year's agenda and hope you take advantage of all of the rich learning opportunities in this year's meeting.

Very close to the meeting venue is the Auraria Higher Education Campus where many of the outdoor sessions will be held. The Metropolitan State University of Denver (MSU, one of the three colleges located on the site and a GLOBE US Partner) and the Auraria Sustainable Campus Program (ASCP) are your local co-hosts this week and I would like to thank them for their enthusiasm and generosity in making their facilities available for us and bringing their local expertise.

The GLOBE Annual Meeting is sponsored by the National Science Foundation (NSF), for which we are very grateful indeed. I would like to thank everyone on the GIO team that put many hours into planning and organizing this meeting and especially Simon Castro-Wooldridge and Tara Torres for their hard work and perseverance to make this meeting the best it can be.

I would also like to acknowledge the immense contribution that Allison Leidner (Program Manager at The GLOBE Program Office) has made over the past 10 years and wish her all the best as she moves into a new role with NASA.

I wish you all a very enjoyable and productive meeting.

Sincerely,

John Ristvey
GLOBE Director of Operations and Implementation

KEYNOTE SPEAKERS



Leila Farhadi, PhD

Associate Professor, Civil and Environmental Engineering, The George Washington University

Dr. Leila Farhadi holds degrees in Civil Engineering and Civil and Environmental Engineering from Sharif University of Technology, Iran, and her doctorate in Civil and Environmental Engineering from Massachusetts Institute of Technology (MIT). She was the recipient of the 2018 NASA’s New (Early Career) Investigator Program award in Earth Sciences, and the NSF’s 2019 CAREER Award for her work.

“The GLOBE Program serves as an exceptional platform that actively promotes open science principles.”

Dr. Farhadi works to develop calibration-free data assimilation techniques to estimate the state and fluxes of terrestrial water, energy and carbon cycles. She integrates an educational component into her research projects. She is an avid supporter of understanding science and collaborating with a diverse community of students, scientists and citizens.

Dr. Farhadi states, “I am deeply passionate about the transformative potential of open science. The GLOBE Program serves as an exceptional platform that actively promotes open science principles, and this further ignites my enthusiasm to be part of this vibrant community.”



Victoria Metcalf, PhD

Principal Advisor of Vocational Education and Training, New Zealand Tertiary Education Commission

Dr. Victoria Metcalf is a scientist, science communicator and stakeholder engagement specialist. She has worked as New Zealand’s National Coordinator of the Participatory Science Platform and was previously the External Engagement Advisor for the Royal Society Te Apārangi, supporting the entire New Zealand research sector.

Dr. Metcalf states, “Open science is about democratizing science - enabling us to use science better and more wisely, creating more inclusive outcomes for people and for our planet.” She advocates for including people beyond the science sector through community involvement.

Dr. Metcalf states that open science is also about considering how science sits alongside and is enhanced by other knowledge systems.

Dr. Metcalf is passionate about engaging with and inspiring the wider community on global scientific issues and challenges. She promotes the power of community science. “A more scientifically literate world and a more community literate science sector can do more good and less harm.”

“Open science is about democratizing science - enabling us to use science better and more wisely, creating more inclusive outcomes.”



Scott McIntosh, PhD

Deputy Director, National Center for Atmospheric Research (NCAR)

Before taking his current role as NCAR Deputy Director, Scott McIntosh was the Director of the High Altitude Observatory. Dr. McIntosh received his First Class Honors Degree in Mathematics

“Open science drives innovation and maintains integrity”

and Physics and his PhD in Astrophysics from the University of Glasgow, Scotland.

Dr. McIntosh’s research in the field of solar physics has focused on three main areas: the detection and impact of magnetohydrodynamic waves; the detection and understanding of ultraviolet and extreme ultraviolet radiation; and understanding the decadal evolution of the solar plasma.

Dr. McIntosh has authored or co-authored over one hundred journal articles since receiving his PhD, including 39 as first author, eight in high-profile (three articles in Nature and five in Science). His current “H-index” is thirty-two and has approximately four thousand citations. Dr. McIntosh’s current area of work is Heliophysics. He has this to say about open science, “Open science drives innovation and maintains integrity!”

SPECIAL SESSION HIGHLIGHT

Contextualizing GLOBE for Indigenous Communities

When: Tuesday • 18 July • 10:00 am-12:00pm

Presenters: Ren Freeman, Al Kuslikis, Teresa Newberry, Elena Sparrow, Victoria Metcalf

Detail: This panel will explore protocols and best practices for contextualizing the GLOBE content through weaving with indigenous communities’ knowledge systems. Topics for discussion will include issues related to this process, such as data sovereignty, Indigenous research practices and knowledge sharing, and community-led partnerships. The panelists will briefly introduce their respective work in this area and engage the participants in a conversation on this topic.



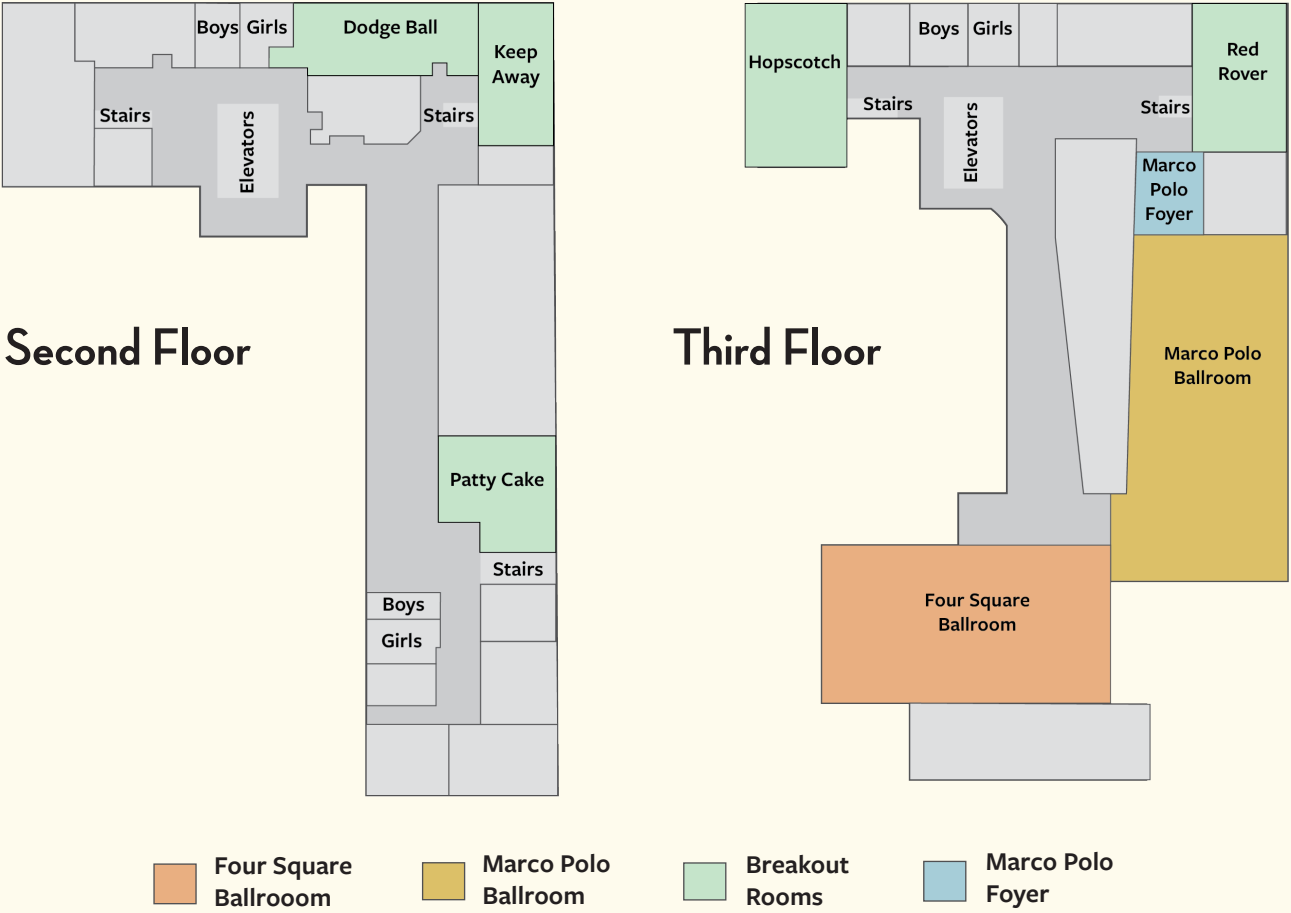
Birch bark harvest and GLOBE protocols. Photo by Nicole James

“If it’s good for Maori, it’s good for everyone.”

“Nothing About Us Without Us.”

FACILITIES

Map of the Curtis Hotel



Map Snapshot of 2023 GLOBE Annual Meeting



Cherry Creek Denver Colorado United States of America

MONDAY • 17 JULY		
7:00 am-5:00 pm	Registration Desk Open	Marco Polo Foyer
8:00 am-9:00 am	Networking Breakfast #1: Working Breakfast Provided All participants together	Four Square Ballroom
9:00 am-10:00 am	2023 GLOBE ANNUAL MEETING OPENING SESSION All participants together in Main Meeting Room WELCOME REMARKS <ul style="list-style-type: none">Land Acknowledgement: Simon Castro-Wooldridge (GIO)Meeting Sponsor: National Science Foundation (NSF): M. Brandon JonesGLOBE Program Office (GPO): Amy Chen, Allison Leidner (NASA)Supporters: Department of State (DOS): Kia Henry, and National Oceanic and Atmospheric Administration (NOAA): John McLaughlinCo-Hosts: Auraria Sustainable Campus Program (ASCP): Rylee McCone, Cassy Cadwallader, and Rich Wagner (MSU)GLOBE Implementation Office (GIO): John RistveySocial Media: Madeline Lane (GIO): A brief about social media during the meeting KEY LOGISTICS AND SAFETY BRIEF <ul style="list-style-type: none">Bob Wiley (UCAR)Logistics and identification of on-duty UCAR staff: Simon Castro-Wooldridge (GIO) HOW TO JOIN THE GLOBE OBSERVER (GO) TEAM FOR THE WEEK <ul style="list-style-type: none">Kristen Weaver (GO) on taking local observations around the meeting sites	Marco Polo Ballroom
10:00 am-10:30 am	Networking Break Tea and Coffee Provided GLOBE ‘Agents of Change’ films screened	Four Square Ballroom
10:30 am-12:00 pm	Program Session #1 Introduce Theme and Strands: Mike Jabot (SUNY, Fredonia) Strategic Plan Progress: Tony Murphy (GIO) Introduce GLOBE Climate Campaign: Grace Crain-Wright (GIO) DIS Report-out: Dave Overoye (DIS)	Marco Polo Ballroom
12:30 pm-1:30 pm	Keynote Speaker #1 Working Lunch Provided Speaker: Leila Farhadi, George Washington University, presentation with Q&A Title: Utilizing Space-Based and Field Site Observations to Quantify and Characterize the Terrestrial Water Cycle	Four Square Ballroom
2:00 pm-3:30 pm	Community Presentation Session #1 See page 14 for detailed Community Agenda Four concurrent sessions in smaller meeting rooms, per strand	Breakout Rooms 1-4
3:30 pm-4:00 pm	Networking Break Tea and Coffee Provided GLOBE ‘Agents of Change’ films screened	Four Square Ballroom
4:00 pm-5:00 pm	Program Session #2 Working Groups Report-out and WG@10 Update: Led by Tony Murphy (GIO) At Close: Brief housekeeping announcement regarding poster session Monday evening, breakfast session Tuesday morning and Student Experience logistics	Marco Polo Ballroom
6:00 pm-8:00 pm	Opening Reception and Poster Presentation Hors d’Oeuvres Provided Display of posters submitted by attendees, including student IVSS and SRS winners. Following the poster session, posters will remain up for the remainder of the meeting.	Four Square Ballroom

TUESDAY • 18 JULY		
8:00 am-5:00 pm	Registration Desk Open	Marco Polo Foyer
8:00 am-9:00 am	Breakfast Discussion Session #1 Working Breakfast Provided All participants together GLOBE Program Sponsor Q&A - NASA, NSF, NOAA, DOS Attendees will have the option to submit questions in drop-boxes for the panel on meeting day 1 Facilitator: John Ristvey (GIO)	Four Square Ballroom
9:00 am-9:10 am	Announcements Reminders	Marco Polo Ballroom
9:10 am-9:40 am	Moon Tree Foundation: Presentation by Rosemary Roosa, President	Marco Polo Ballroom
9:45 am-4:00 pm	Student Experience Day #1 Offsite Students will be transported around Denver for the day. Includes Denver Museum of Nature & Science (DMNS) and data collection at the MSU campus. Packed lunch for students. Led by Grace Crain-Wright (GIO) and Peter Falcon (NASA)	Auraria Campus
9:40 am-12:00 pm	Learning about Protocols Session #1 Transport provided or a 10-minute walk to Auraria Campus Focus on pedosphere protocols Led by Lynne Hehr (Education WG Chair) and Rich Wagner (MSU)	Auraria Campus
10:00 am-12:00 pm	Special Session: Open Science Title: Contextualizing GLOBE for Indigenous Communities and Students Panel led by Teresa Newberry, Ren Freeman, Al Kuslikis, Elena Sparrow and Victoria Metcalf	Marco Pollo Ballroom
12:30 pm-1:30 pm	Keynote Speaker #2 Working Lunch Provided Speaker: Scott McIntosh (NCAR Deputy Director), presentation with Q&A Title: The Sun, the Moon and Us	Four Square Ballroom
2:00 pm-3:30 pm	Community Presentation Session #2 See page 15 for detailed Community Agenda Four concurrent sessions in smaller meeting rooms, per strand	Breakout Rooms 1-4
3:30 pm-4:00 pm	Networking Break Tea and Coffee Provided	Four Square Ballroom
4:00 pm-5:00 pm	Program Session #3 GLOBE Observer: the Eclipse. Led by Kristen Weaver (GLOBE Observer Deputy Project Coordinator) Marco Polo Ballroom Social Media In Review: June 2022-June 2023, by Tessa Clougherty (Social Media and Communications Intern) Marco Polo Ballroom Update on e-training protocols, followed by community Q&A on this topic. Led by Grace Crain-Wright (GIO) Red Rover Trainer / mentor trainers: process and practice. Led by Education Working Group Hopscotch At close: brief housekeeping announcement, in each breakout room, regarding break-fast session Wednesday morning and NCAR Mesa Lab visit arrangements	Marco Polo Ballroom and Breakout Rooms
5:15 pm-6:45 pm	US Partner and Country Coordinator meeting (joint) All participants together Led by Lyn Wigbels (GIO International Coordinator) and Jen Bourgeault (US CC)	Marco Polo Ballroom

DETAILED AGENDA

WEDNESDAY • 19 JULY		
8:00am-1:00pm	Registration Desk Open	Marco Polo Foyer
8:00 am-9:00 am	Breakfast Discussion Session #2 Working Breakfast Provided All participants together Topic: Work Group re-visioning Led by Tony Murphy (GIO)	Four Square Ballroom
9:00 am-9:15 am	Announcements Reminders	Marco Polo Ballroom
8:15 am-3:45 pm	Student Experience Day #1 Offsite (Boulder) Students will be transported to Boulder for the day. Includes NCAR tour and fieldwork around Boulder. Lunch for students provided at NCAR Mesa Lab Cafeteria. Led by Grace Crain-Wright (GIO) and Peter Falcon (NASA)	Offsite Boulder
9:15 am-12:00 pm	Learning about Protocols Session #2 Carbon Cycle. Led by Jen Bourgeault (US Country Coordinator) and Todd Toth (NASA) Red Rover Graminoid Biomass and Pedosphere. Led by Reem Hasan (GLOBE Teacher), Rod Allan de Lara (GLOBE Mentor Trainer), Joan Callope (GLOBE Teacher & Trainer) Hopscotch	Breakout Rooms
9:15 am-12:00 pm	Program Session #4 GLOBE Regional Coordination Offices (RCO) capacity building / data literacy initiatives Led by Lyn Wigbels (150 mins) Marco Polo Ballroom Using GLOBE's Advanced Data Access Tool (ADAT) Led by DIS (60 mins) Keep Away Evaluation Community of Practice Led by Eleanor Jaffee (60 mins) Dodge Ball	Marco Polo Ballroom and Breakout Rooms
Afternoon	Free Afternoon Box lunches provided at Curtis Hotel	
12:30 pm-5:15 pm	Optional NCAR Mesa Lab Tour NCAR Mesa Lab tour and nature walk (Boulder) Transport provided hotel-NCAR-hotel Two tours arranged (1) 2:30 pm-3:30 pm; (2) 3:00 pm-4:00 pm (max 30 per tour) Afternoon tea / coffee and cake provided at Mesa Lab (3:45-4:15 pm). Opportunity to connect with NCAR scientists	Offsite Boulder
5:30 pm-8:30 pm	Optional GLOBE Gives Back Cherry Creek clean-up, five minutes walk from the Curtis Hotel. Led by Auraria Sustainable Campus Program (ASCP). Participants sign up for one-hour slots and need to sign ASCP waiver.	Offsite Cherry Creek

THURSDAY • 20 JULY		
8:00 am-5:00 pm	Registration Desk Open	Marco Polo Foyer
8:00 am-8:45 am	Networking Breakfast #2: Working Breakfast Provided All participants together	Four Square Ballroom
8:45 am-9:00 am	Announcements Reminders	Marco Polo Ballroom
9:00 am-10:00 am	Program Session #5 Proposing a Protocol: Amy Chen (GPO), Tony Murphy (GIO), members of the science Working Group Marco Polo Ballroom What does GLOBE's Air Temperature Data Say about Global Warming? Led by Dave Overoye & Cornell Lewis (DIS) Red Rover GLOBE Alumni Networking: Led by Karl Clarke (GIO) Hopscotch	Marco Polo Ballroom and Breakout Rooms
10:00 am-10:30 am	Networking Break Tea and Coffee Provided	Four Square Ballroom
10:30 am-12:00 pm	Community Presentation Session #3 See page 16 for detailed Community Agenda Five concurrent sessions in smaller meeting rooms, per strand	Marco Polo Ballroom and Breakout Rooms
12:30 pm-1:30 pm	Keynote Speaker #3 Working Lunch Provided Speaker: Victoria Metcalf (GLOBE New Zealand Country Coordinator), presentation and Q&A Title: Education in Antarctica - Why Relationships Matter for Global Outcomes	Four Square Ballroom
1:45 pm-3:00 pm	Program Session #6 Students reporting back on the protocols sessions and the student experience, students at round tables presenting their work while adult attendees rotate	Marco Polo Ballroom
3:00 pm-3:30 pm	Networking Break Tea and Coffee Provided	Four Square Ballroom
3:30 pm-5:00 pm	Closing Session Review meeting objectives and identify next steps: Amy Chen (GPO), Sponsors, John Ristvey (GIO), Co-hosts (ASCP, MSU), Working Group chairs Show 'Week in Review' film Acknowledgements: Simon Castro-Wooldridge (GIO)	Marco Polo Ballroom
6:00 pm-10:00 pm	Meeting Banquet and Official Closing Full Dinner Provided Group photo will be taken	Four Square Ballroom

AGENDA SNAPSHOT

Networking, dining, snacks Keynote Speaker Programs Sessions Student Experience Banquets and Events Field Trips and Off-Site Activities

TIME	MONDAY • 17 JULY	TUESDAY • 18 JULY
Early Morning	Registration desk open • 7:00 am-5:00 pm	Registration desk open • 8:00 am-5:00 pm
	Networking Breakfast #1 8:00 am-9:00 am	Breakfast Discussion Session #1 8:00 am-9:00 am Announcements Reminders 9:00 am-9:10 am
	Opening Session 9:00 am-10:00 am	Moon Tree Foundation Presentation 9:10 am-9:40 am
Morning	Networking Break 10:00 am-10:30 am	Student Experience Day #1 9:45 am-4:00 pm
	Program Session #1 10:30 am-12:00 pm	Learning About Protocols Session #1 9:40 am-12:00 pm Special Session Open Science 10:00 am-12:00 pm
Lunch	KEYNOTE SPEAKER NO. 1 Leila Farhadi George Washington University Working Lunch Provided 12:30 pm-1:30 pm	KEYNOTE SPEAKER NO. 2 Scott McIntosh NCAR Deputy Director Working Lunch Provided 12:30 pm-1:30 pm
Afternoon	Community Presentations #1 Four concurrent sessions in meeting rooms Four strands 2:00 pm-3:30 pm	Community Presentations #2 Four concurrent sessions in meeting rooms Four strands 2:00 pm-3:30 pm
	Networking Break 3:30 pm-4:00 pm	Networking Break 3:30 pm-4:00 pm
	Program Session #2 4:00 pm-5:00 pm	Program Session #3 4:00 pm-5:00 pm
Evening	Opening Reception and Poster Presentation 6:00 pm-8:00 pm	US Partner and Country Coordinator Meeting 5:15 pm-6:45 pm

Networking, dining, snacks Keynote Speaker Programs Sessions Student Experience Banquets and Events Field Trips and Off-Site Activities

TIME	WEDNESDAY • 19 JULY	THURSDAY • 20 JULY
Early Morning	Registration desk open • 8:00 am-1:00 pm	Registration desk open • 8:00 am-5:00 pm
	Breakfast Discussion Session #1 8:00 am-9:00 am Announcements Reminders 9:00 am-9:10 am	Networking Breakfast #2 8:00 am-8:45 am Announcements Reminders 8:45 am-9:00 am
	Student Experience Day #2 8:15 am-3:45 pm	Program Session #5 9:00 am-10:00 am
Morning	Learning About Protocols Session #2 9:15 am-12:00 pm Program Session #4 9:15 am-12:00 pm	Networking Break 10:00 am-10:30 am Community Presentations #3 Five concurrent sessions in meeting rooms Four strands 10:30 am-12:00 pm
Lunch	FREE AFTERNOON Boxed Lunch Provided	KEYNOTE SPEAKER NO. 3 Victoria Metcalf GLOBE New Zealand Country Coordinator Working Lunch Provided 12:30 pm-1:30 pm
Afternoon	NCAR Mesa Lab Tour (optional) Boulder 12:30 pm-5:15 pm	Program Session #6 1:45 pm-3:00 pm
		Networking Break 3:00 pm-3:30 pm
		Closing Session 3:30 pm-5:00 pm
Evening	GLOBE Gives Back (optional) Cherry Creek Denver 5:30 pm-8:30 pm	Meeting Banquet and Official Closing 6:00 pm-10:00 pm

COMMUNITY PRESENTATION SESSIONS • MONDAY • 17 JULY

- Strand 1 (IBC)
In and Beyond Classrooms
- Strand 2 (MBB)
Mobilizing Beyond Borders
- Strand 3 (MBD)
Mapping Beyond Dots
- Strand 4 (BES)
Benefits for Environment and Society

MONDAY • 17 JULY • 2:00 PM-3:30 PM			
RED ROVER ¹	HOPSCOTCH	KEEP AWAY	DODGEBALL
In and Beyond Classrooms	Mobilizing Beyond Borders	Mapping Beyond Dots	Benefits for Environment and Society
<p>LIGHTNING TALK</p> <p>Tracy Ostrom: <i>Using GLOBE Mission Earth Quick Start Guides to Engage Students with GLOBE and NASA Assets</i></p> <p>Julie Houck: <i>From the Classroom to Beyond: A GLOBE Teacher’s Perspective</i></p> <p>Ngosse Fall: <i>The Positive Impact of GLOBE in Education</i></p>	<p>LIGHTNING TALK</p> <p>Claudia Romagnoli: <i>Descriptive Study of the Changes Produced Throughout the Seasons in Tree Species of Argentina and Spain</i></p> <p>Ana Prieto: <i>Trees Within LAC” Campaign</i></p> <p>Alessandra Sutti: <i>The Microplastics Monitoring Protocol Trial - Crossing Borders to Make the Invisible Visible</i></p>	<p>LIGHTNING TALK</p> <p>Lenka Kleger: <i>Sharing Student Research Stories</i></p> <p>Mullica Jaroensutasinee: <i>Geographical Variation in Mosquito Key Breeding Sites Using GLOBE Observer Mosquito Habitat Mapper App Data</i></p> <p>Cassie Soeffing: <i>Earth System Explorers Virtual Internship for High School Students</i></p>	<p>LIGHTNING TALK</p> <p>Nektaria Adaktilou: <i>Exploring Student STEM Identity in the GLOBE Mission EARTH Program</i></p> <p>Bo Lebo: <i>K12 Student Integration Within Natural Environment Using STEM, STEAM and Each Child Our Future with Intergenerational Coaching and Real Time Data Collection (Transdisciplinary Investigation)</i></p> <p>Shannon Conner: <i>Expanding the Accessibility of Hydrosphere Protocols by Supporting Classroom Teachers</i></p>
<p>TRADITIONAL PRESENTATION</p> <p>Todd Toth: <i>Measuring CO2 and Your Carbon Footprint</i></p> <p>Beatrice Oyange: <i>The Little GLOBE Voices - Scientific Inquiry</i></p> <p>Samornasri Kanphai: <i>The Extension of GLOBE Research Program to Strengthen Local Wisdoms in Rural Areas of Thailand</i></p>	<p>TRADITIONAL PRESENTATION</p> <p>Mike Jabot: <i>Building Global Citizenship through Environmental Science Diplomacy: Professional Development Opportunities for NASA GLOBE Teachers</i></p> <p>PANEL DISCUSSION</p> <p>Dixon Butler / Kia Henry / Lyn Wigbels: <i>Catalyzing International GLOBE Implementation Through GLOBE Plus Post</i></p>	<p>TRADITIONAL PRESENTATION</p> <p>Svetlana Darche: <i>Shared Measures to Monitor Student Learning Through GLOBE Projects</i></p> <p>PANEL DISCUSSION</p> <p>Marile Colon Robles: <i>Taking GLOBE Data One Step Further with AI and ML</i></p>	<p>TRADITIONAL PRESENTATION</p> <p>Jessica Taylor: <i>Promoting Environmental Stewardship and Equity Through Camp Partners</i></p> <p>Matthijs Begheyn: <i>Validating NO2 Satellite Measurements by GLOBE Students on the Ground</i></p> <p>Kevin Czajkowski: <i>Engaging Learners in Air Quality Studies Using Small Sensors</i></p>

COMMUNITY PRESENTATION SESSIONS • TUESDAY • 18 JULY

- Strand 1 (IBC)
In and Beyond Classrooms
- Strand 2 (MBB)
Mobilizing Beyond Borders
- Strand 3 (MBD)
Mapping Beyond Dots
- Strand 4 (BES)
Benefits for Environment and Society

TUESDAY • 18 JULY • 2:00 PM-3:30 PM			
RED ROVER	HOPSCOTCH	KEEP AWAY	DODGEBALL
In and Beyond Classrooms	Mobilizing Beyond Borders	In and Beyond Classrooms	Benefits for Environment and Society
<p>LIGHTNING TALK</p> <p>Janet Struble: <i>Mobilizing Beyond Your GLOBE Partnership Borders</i></p>	<p>LIGHTNING TALK</p> <p>Myron Williams: <i>The PanAfri-GLOBE Initiative</i></p> <p>Kevin Czajkowski: <i>Urban Heat Island Intensive Observation Period: Engagement of Students Through GLOBE</i></p> <p>Rafaela Babish: <i>How Cool is Your School?: Urban Heat Island Effect: Israel, Ireland and Malta Collaboration</i></p>	<p>SYMPOSIUM</p> <p>Stuart Robottom Leads: <i>Microplastics in Surface Waters: Their Discovery, a Draft Protocol, Cross-continent GLOBE Student and Teacher Experiences, Next Steps Towards 2030 (90 minutes)</i></p> <p>Panel discussion includes Ed Carpenter, Tracy Ostrom, Matt Ferner, Lenka Kleger, Alessandra Sutti and Sandro Sutti</p>	<p>TRADITIONAL PRESENTATION</p> <p>Virgil Lorenzo: <i>Inclusion of Low-income Families into GLOBE Community</i></p> <p>Constantinos Cartalis: <i>Open Science in Support of the Study of Cities as Urban Ecosystems</i></p>
<p>TRADITIONAL PRESENTATION</p> <p>Lucrecia Tripp: <i>Preparing Preservice Teachers to Use GLOBE Activities in the Primary and Elementary Classroom</i></p> <p>Eleanor Jaffee and Dixon Butler: <i>The U.S. GLOBE Regional and Local Student Research Symposia: Connecting Young Environmental Science Researchers Within and Across U.S. Communities</i></p>	<p>TRADITIONAL PRESENTATION</p> <p>Mike Jabot: <i>From Local Implementation to Global Impact: GLOBE’s Role in Achieving SDGs through Environmental Science Diplomacy at the UN GA Science Summit</i></p>	<p>Mini-workshop on the protocol follows the panel discussion</p>	<p>PANEL DISCUSSION</p> <p>Becky Boger: <i>How Does GLOBE Help Increase Climate Literacy, Environmental Literacy and Build Healthy Communities?</i></p>
<p>PANEL DISCUSSION</p> <p>Nektaria Adaktilou: <i>Seven years of GLOBE Mission EARTH Evaluation: Lessons Learned</i></p>	<p>TRADITIONAL PRESENTATION</p> <p>Marile Colon Robles: <i>Feedback Requested on GLOBE Cloud Satellite Matches</i></p>		

COMMUNITY PRESENTATION SESSIONS • THURSDAY • 20 JULY

THURSDAY • 20 JULY • 10:30 AM-12:00 PM					
MARCO POLO BALLROOM	HOPSCOTCH	HOPSCOTCH	KEEP AWAY	DODGEBALL	PATTY CAKE
In and Beyond Classrooms	Mobilizing Beyond Borders	In and Beyond Classrooms	In and Beyond Classrooms	Benefits for Environment and Society	In and Beyond Classrooms
TRADITIONAL PRESENTATION Sara Mierzwiak: <i>GLOBE Mission EARTH & Earth Heart Farms: 80 acre Land Conservation and GLOBE Festivals</i>	TRADITIONAL PRESENTATION Olawale Oluwafemi: <i>Engaging Directly with Students via NASA SEES, Upward Bound, and the GLOBE Kids Club</i>	LIGHTNING TALK Dorian Janney: <i>Telling Your Story</i>	HANDS-ON ACTIVITY Kristen Weaver: <i>STELLA: A Do-it-Yourself Handheld Spectrometer</i>	LIGHTNING TALK Vivienne Byrd and Theresa Schwerin: <i>Resources (library kits) that support GLOBE implementation in public libraries</i>	TRADITIONAL PRESENTATION Kunga Phuntsho: <i>Favorable condition for the growth of orange trees</i>
MINI WORKSHOP Christina Buffington: <i>Build a Frost Tube</i>	MINI WORKSHOP Rosalba Giarrantano: <i>DevelopingScience Communication Skills using GLOBE Nature Notes</i>	TRADITIONAL PRESENTATION Lenka Kleger: <i>GLOBE changes the urban environment</i> Hameed Sulaiman: <i>Bundle protocol as an integration tool towards a significant learning experience for GLOBE students and teachers</i>	TRADITIONAL PRESENTATION David Bydlowski: <i>AREN Project: A STEM model implementing open science</i>	MINI WORKSHOP Becca Hatheway, John Ristvey and the Accessibility Subcommittee: <i>Exceptional Needs Workshop: Using Visual Impairment (VI) Simulators with a GLOBE Learning Activity and science protocols</i>	MINI WORKSHOP Claudia Caro: <i>Learning activities linked with the GLOBE Regional Campaign: Trees within LAC</i>
		PANEL DISCUSSION John Moore: <i>A3Sat: using CubeSat emulators to broaden advanced international participation in EarthSTEM education</i>	MINI WORKSHOP Brian Campbell: <i>Taking Tree Height Observations with ICESat-2 Comparisons</i>		

IVSS STIPEND RECIPIENTS

UNITED STATES

Title: *Comparing Select Atmospheric Parameters Between Disparate Geographic Locations Using Collaboration Between Two GLOBE Schools*
Teacher: Diana Rae Johns

Students: Adam Baydoun, Isabella Jomaa, Savannah Jomaa, Malik Mashlab
Additional Contributors: Qatar students (grades 9-12)
School: Crestwood High School, Dearborn, Michigan, US

Title: *Predicting Volume of Mosquito Borne Diseases Using A.M.E.A. Sensor / Radio Network*
Teacher: Cassie Soeffing
Students: Miguel Jose Bueno, James Ervin, Anushka Jain, Owen Luo, and Aarnav Tendulkar (grades 9-12)
Additional Contributors: Dr. Rusty Low, IGES Peder Nelson, OSU, SME, Dr. Erika Podest, NASA JPL Andrew Clark, IGES, EO Researcher and Data Analyst
School: Institute for Global Environmental Strategies (IGES) GLOBE v-School, Virginia, USA

AFRICA

Title: *Investigating the Impact of Mulch on Soils*
Teacher: Henry Moseti
Students: Khushi Aggarwal, Darren Amore, Khairoon Ridhwan, Celestine Claude (grades 9-12)
Additional Contributors: Dorcas Neema, Benard Mabele
School: Shree Swaminnarayan Academy, Mombasa, Kenya

NEAR EAST AND NORTH AFRICA

Title: *Soil (Pedosphere) Investigations*
Teacher: Wejdan Melhem
Students: Rama Bani Yassin, Heba Altaweel, Sarah Hamadne, Ameera Alghawi, Nada Bataineh (graduates)
School: King Abdullah The Second School for Excellence, Irbid, Jordan

SRS TEAMS ATTENDING 2023 GLOBE ANNUAL MEETING

SOUTHEAST

Title: *What's Up?*
Recognition: Community Impact and Engagement
Teacher: Jo'el Givens **Students:** Jesus Gonzalez, Ja'Myria Robertson, Noe Gonzalez, Horace Dees
School: St. Helena College and Career Academy

SOUTHWEST

Title: *Biodiversity*
Recognition: 21st Century Skills
Teacher: Joe Ferrara **Students:** Isabella Rodriguez, Emily Torres, Jayci Robbins, Luca Ferrara
School: All Saints' Episcopal School

LATIN AMERICA AND CARIBBEAN

Title: *Relación Entre El Avistamiento de Mariposas, Las Variables Ambientales y La Vegetación del Patio Escolar*
Teacher: Darío Greni
Students: Matias Cabrera, Rocío Cabrera, Lucas Damián, Paloma Galaviz, Martin Martinez, Lucas Caballero, Victoria Brener, Maite Verde, Adrian Suarez, Bastian Cuadro, Fabián Delgado, Francisco Andruskievich, Pierina Briozzo (grades 6-8)
Additional Contributors: Andrea Ventoso, Country Coordinator, Gabriela Bentancur Viglione, Bióloga
School: Escuela No. 88 Alfredo B. Nobel, Canelones, Uruguay

ASIA PACIFIC

Title: *Investigating a Comprehensive Study on the Factors Influencing Color Change in Caladium bicolor for Enhanced Cultivation and Economic Benefits in Horticulture*
Teacher: Pornpawit Tabchum
Students: Sinchai Nukhong, Natcha Siriwat, Piyatida Puangsanthea (grades 6-8)
Additional Contributors: Rommel De La Cruz, Chote Chitkhao, Paphayompittayakom School; Dr. Chontira Sangsuban, Ms. Nureeya Bintuan, Thaksin University
School: Paphayomphittayakom School, Phatthalung, Thailand

EUROPE | EURASIA

Title: *Connection between peat and plants*
Teacher: Jaan Pärn
Students: Antonela Nikolić III. osnovna škola Varaždin, Lara Draganić III. osnovna škola Varaždin, Aistê Justinavičiūtė, Birštono gimnazija, Domilė Laukaitytė, Birštono gimnazija, Kadiliis Kütt, Kääpa Põhikool, Ema Težak III. osnovna škola Varaždin, Marit Löbu, Põlva Kool, Emili Matjushenko, Jõhvi Vene Põhikool, Kelly Saar, Antsla Gümnaasium, Teele Piirimäe, Rakvere Reaalkool (grades 9-12)
Additional Contributors: Sabrina Moore, Johanna Raudsepp, Laura Altin
School: Estonian Learning Expedition, Ka'a'riku Estonia

PACIFIC

Title: *The Impacts of Gentrification/Modernization in Our Community*
Recognition: Indigenous/Community Knowledge
Teacher: Zulema Gonzalez **Students:** Tatiana Suarez, Marina Vasquez
School: Assurance Learning Academy

MIDWEST

Title: *Macroinvertebrates: A Leaf Pack Experiment*
Recognition: 21st Century Skills
Teacher: Steven Frantz **Students:** Stevie Franz, Elizabeth Franz
School: Roswell Kent Middle School

STUDENT EXPERIENCE AGENDA

Networking, dining, snacks Keynote Speaker Programs Sessions Student Experience Banquets and Events Field Trips and Off-Site Activities

TIME	MONDAY 17 JULY	TUESDAY 18 JULY	WEDNESDAY 19 JULY	THURSDAY 20 JULY
8:00 am-10:15 am	Breakfast Opening Address	Breakfast: Go over student projects; Bus to MSU Campus	Breakfast Group Work Bus to NCAR Mesa Lab	Breakfast Group Work Bus to History Colorado
10:30 am-12:00 pm	Prep for Poster Session	Data Collection at MSU Campus	Hike and Data Collection Learning Lab	Session with Liz Cooke at History Colorado
12:00 pm-1:30 pm	Lunch Keynote	Packed Lunch	Packed Lunch	Lunch Keynote
1:30 pm-3:15 pm	Icebreaker Session	Bus to DMNS; Planetarium Showing and DMNS Tour	Hike and Data Collection Learning Lab	Present Projects to Meeting Participants Round Table Format
3:30 pm-5:30 pm	Cultural Session and Storytelling	Return to Hotel Group Work	Return to Hotel Group Work	
6:00 pm-8:30 pm	Poster Session	Free Time Movie Night	Free Time Q&A Session With GISN Members	Banquet

STUDENT EXPERIENCE DAILY DETAIL OVERVIEW

DAY	TIME	ACTIVITY
Monday 17 July Curtis Hotel	8:00 am-9:00 am	Breakfast at Curtis Hotel
	9:00 am-10:00 am	Opening Session
	10:30 am-12:00 pm	Free time; prep for poster session
	12:30 pm-1:30 pm	Lunch; keynote speaker session
	1:45 pm-3:15 pm	Ice breaker session, free time
	3:30 pm-5:15 pm	Cultural exchange with other students
	5:30 pm-6:00 pm	Set up posters
	6:00 pm-8:00 pm	Poster session; hors d'oeuvres provided
Tuesday 18 July DMNS, MSU Campus, Curtis Hotel	8:00 am-8:45 am	Breakfast at Curtis Hotel
	9:00 am	Leave for MSU Campus
	9:15 am	Arrive at MSU Campus
	9:15 am-11:15 am	Data collection and LAP around MSU Campus
	11:15 am-12:00 pm	Lunch at MSU Campus
	12:00 pm	Leave for DMNS
	12:20 pm	Arrive at DMNS for visit (tour and Planetarium showing)
	1:00 pm	Planetarium showing
	1:30 pm-3:00 pm	Tour of DMNS
	3:30 pm	Leave for Curtis Hotel
Wednesday 19 July NCAR Mesa Lab Boulder and Curtis Hotel	4:00 pm-6:00 pm	Free time, group work, games
	6:15 pm-8:30 pm	Movie night!
	7:30 am-8:15 am	Breakfast at Curtis Hotel
	8:15 am	Leave for NCAR Mesa Lab (Boulder)
	9:00 am	Arrive at NCAR Mesa Lab (Boulder)
	9:15 am-12:00 pm	Data collection / Learning Lab / Moon Tree
	12:00 pm-1:00 pm	Lunch at Mesa Cafeteria
	1:15 pm-2:50 pm	Data collection / Learning Lab
	3:00 pm	Leave for hotel
	4:00 pm-6:00 pm	Free time, group work, dinner on own
Thursday 20 July Curtis Hotel	6:15 pm-8:30 pm	QA Session with GISN members
	8:00 am-9:00 am	Breakfast at Curtis Hotel
	9:05 am-9:55 am	Group work and presentation preparation
	10:00 am	Pick up from Curtis Hotel
	10:30 am-12:15 pm	Session with Liz Cook (History Colorado)
	12:30 pm	Pick up from History Colorado
	12:45 pm-1:30 pm	Lunch; keynote speaker session
	1:45 pm-3:00 pm	Student showcase (round table of presentation for AM participants)
	3:00 pm-6:00 pm	Free time (can attend main Annual Meeting sessions)
	6:00 pm-10:00 pm	Closing session and banquet

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Allison Leidner
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Marina Pavlič, Croatia, *Europe and Eurasia*
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Technology

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Kris Jaroensutasinee, Thailand, *Asia and Pacific*
Matthijs Begheyn, The Netherlands, *Europe and Eurasia*

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LAND ACKNOWLEDGEMENT

We acknowledge that our meeting is taking place on the traditional and unceded territory of the Ute, Cheyenne, and Arapaho Peoples. We also recognize the 48 contemporary Indigenous Tribes and Nations who have historically called Colorado home.

We pay our respects to Elders past, present, and future, and to all those who have stewarded the land and water for generations. May this acknowledgement express GLOBE’s commitment to grow and deepen its relationships with the vibrant Indigenous communities who continue to thrive and uphold their sacred relation to this land.

2023 GLOBE ANNUAL MEETING

We would like to thank the following individuals for their support and work to make this meeting possible:

International Organizing Committee (IOC)

Lyn Wigbels, Co-chair, USA, GIO International Coordinator
Denise “Skye” Yost, Co-chair, USA

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GLOBE Student Vloggers

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Xavier Moloi, South Africa

